The
Rapid Ecosystem Analysis for

Stormwater

Trees decrease total stormwater volume and slows peak flow; both help cities to manage their stormwater and decrease detention costs. CITYgreen assesses how land cover, soil type, and precipitation affect stormwater runoff volume. It calculates the volume of runoff in a 2-year 24-hour storm event that would need to be contained by stormwater facilities if the trees were removed. This volume multiplied by local construction costs calculate the dollars saved by the tree canopy. The anaysis uses the TR-55 model developed by the Natural Resource Conservation Service (NRCS) which is very effective in evaluating the effects of land cover/land use changes and conservation practices on stormwater runoff. The TR-55 calculations are based on curve number which is an index developed by the NRCS, to represent the potential for stormwater runoff within a drainage area. The higher the curve number the more runoff will occur. This analysis determines a curve number for the landcover conditions in 1992 and generates a curve number for the conditions if the trees are removed and replaced with urban landuse. The change in curve number reflects the increase in the volume of stormwater runoff.

Water Quantity (Runoff)

2-yr, 24-hr Rainfall: in.

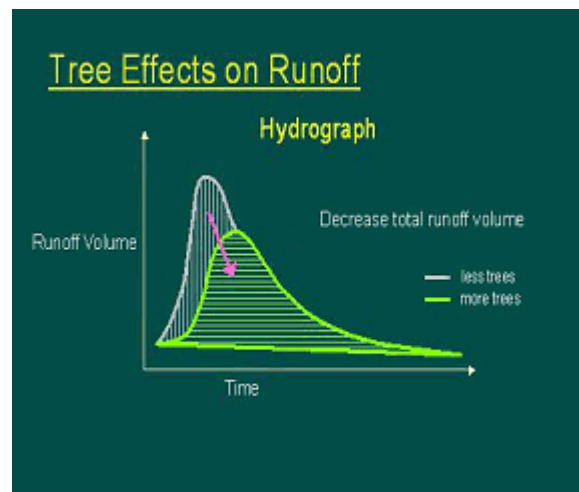*Curve Number based on 1992 Landcover:*

Curve Number reflecting landcover if trees are removed and replaced with urban: **98**

Additional Storage volume needed (to mitigate the change in peak flow): cu. ft.

Construction cost per cu. ft.:

Total Stormwater Savings:

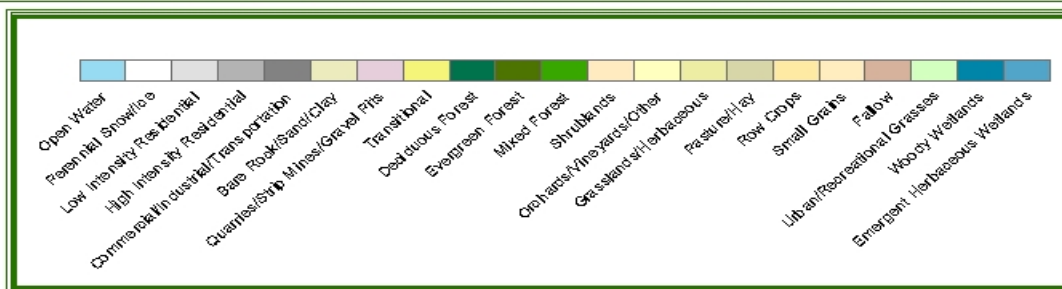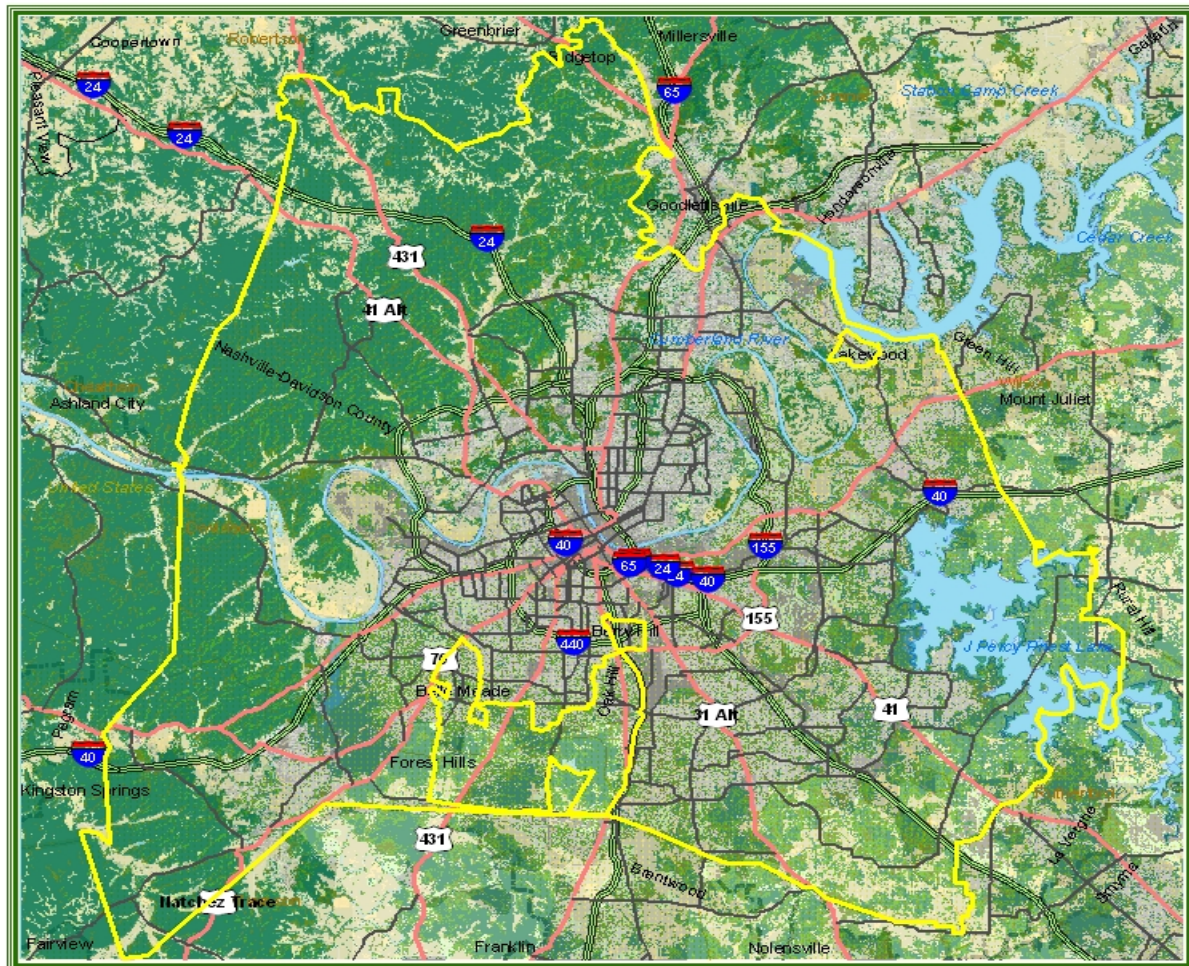**Annual costs based on payments over 20 years at 6% interest:** **per year**

Water Quality (Contaminant Loading)

Cities must comply with Federal clean water regulations and develop plans to improve the quality of their streams and rivers. Trees filter surface water and prevent erosion, both of which maintain or improve water quality. Using values from the US Environmental Protection Agency (EPA) and Purdue University's L-thia spreadsheet water quality model, The Natural Resources Conservation Service (NRCS) developed the CITYgreen water quality model. This model estimates the change in the concentration of the pollutants in runoff during a typical storm event given the change in the land cover. This model estimates the Event Mean Concentrations of Nitrogen, Phosphorus, Suspended Solids, Zinc, Lead, Copper, Cadmium, Chromium, Chemical Oxygen Demand(COD), and Biological Oxygen Demand (BOD). Pollutant values are shown as a percentage of change.

Percent Change in Contaminant Loadings

The

Rapid Ecosystem Analysis

Legend:

Open Water · Perennial Snow/Ice · Low Intensity Residential · High Intensity Residential · Commercial/Industrial/Transportation · Bare Rock/Sand/Clay · Quarries/Strip Mines/Gravel Pits · Transitional · Deciduous Forest · Evergreen Forest · Mixed Forest · Shrublands · Orchards/Vineyards/Other · Grasslands/Herbaceous · Pasture/Hay · Row Crops · Small Grains · Fallow · Urban/Recreational Grasses · Woody Wetlands · Emergent Herbaceous Wetlands

Scale: 0 0.40 0.8 1.6 2.4 3.2 Miles

Projection:
Albers Conformal Conic Equal Area
Central Meridian: -96°
Latitude of Origin: 23°
1st Standard Parallel: 29°30' 00"
2nd Standard Parallel: 45°30' 00"
Datum: North American Datum of 1983

Image Data: National Land Cover Data 1992
30-meter resolution
Source: U.S. Geological Service (USGS)